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Education Consortium for the Advancement of STEM in Egypt (ECASE)

QUARTERLY PROGRESS REPORT

JANUARY– MARCH 2016



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Education Consortium for the Advancement of STEM in Egypt (ECASE)

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Acronyms

| | |
|---------|--|
| 21PSTEM | The 21 st Century Partnership for STEM Education |
| ACT | American College Testing (exam) |
| AIP | Annual Implementation Plan |
| BOT | Board of Trustees (school) |
| CA | Cooperative Agreement |
| CDRS | Curriculum Design Review Studio |
| CMS | Content Management System |
| COP | Chief of Party |
| DEC | Department of Educational Computing |
| DCOP | Deputy Chief of Party |
| ECASE | Education Consortium for the Advancement of STEM in Egypt (USAID) |
| ESF | Education Support Fund |
| ELP | English Language Program |
| GILO | Girls' Improved Learning Outcomes Project (USAID) |
| GOE | Government of Egypt |
| GTM | GoToMeeting |
| HR | Human Resources |
| IAT | It's About Time |
| ICT | Information and Communications Technology |
| LO | Learning Outcome |
| MAP | Management Assessment Protocol |
| M&E | Monitoring and Evaluation |
| MOE | Ministry of Education |
| MOHE | Ministry of Higher Education |
| MSI | Management System International |
| NCEEE | National Center for Educational Evaluation and Examination |
| PARLO | Proficiency-based Assessment and Reassessment of Learning Outcomes |
| PAT | Professional Academy of Teachers (MOE) |
| PD | Professional Development |
| PMP | Performance Monitoring Plan |
| QPR | Quarterly Progress Report |
| SCOPE | Standards-based Classroom Observation Protocol for Egypt |
| SEPUP | Science Education for Public Understanding Program |
| STEM | Science, Technology, Engineering, Math |
| STTA | Short Term Technical Assistance |
| TDC | Technology Development Center |
| TIES | Teaching Institute for Excellence in STEM |
| TFI | The Franklin Institute |
| TILO | Technology for Improved Learning Outcomes (USAID) |
| TOT | Training of Trainers |
| WL | World Learning |
| US | United States of America |
| USAID | United States Agency for International Development |

1. Summary of activities

This Quarterly Progress Report (QPR) details activities and accomplishments of the USAID – funded Education Consortium for the Advancement of STEM in Egypt (ECASE) Program, from January 1, to March 31, 2016. The report discusses work undertaken by World Learning working collaboratively with consortium partners (21PSTEM, TIES, and TFI) in close cooperation with the Ministry of Education and its affiliates.

- **2014 – 2015 Students Graduation Ceremony** – In March 3rd, 2016, Maadi STEM school for Girls and 6th October STEM school for Boys celebrated the graduation day for the second graduates' cohort of Boys in 6th of October School and the first graduates' cohort of girls in Maadi School.

The graduation ceremony was held at the Educational City. The ceremony was attended by the Minister of Education and Technical Education, Katie Donohoe director, Office of Education and Training, USAID/Egypt Giza Governor, the Head of Arab Academy for Science, Technology and Maritime Transport, and project AOR Hala Elserafy as well as a number of private universities deans.



Some graduates from both schools gave speeches that reflected their experience during the three years they have spent at their STEM schools, and they expressed gratitude to their teachers, principals and parents for their constant academic and personal support.

In addition to the graduate students, both schools' principals gave speeches showing the cooperation and level of effort they provide to the STEM students in order to help them to succeed.

At the end of the event, the Minister gave his speech and distributed the graduation certificates to the Graduate STEM Students, Boys and Girls.

- **Measuring the Results of Professional Development Activities** – During this quarter ECASE revised the COS into a tool that can be used to assess the performance of STEM teachers and provide quantifiable measures for the results of training. The tool was quickly piloted in Maadi and October schools and modified in collaboration with a group of MoE supervisors who

had previous experience in collecting data using observation forms. Data collectors training was conducted for three days and included an introduction to Egypt STEM Schools, training on the data collection tool and video practice for inter-rater reliability. ECASE developed a plan for data collection which was conducted during the month of March. The population included both STEM and humanities teachers with the most training hours and the least training hours. The data analysis and reports will be completed in the following quarter.

- **Capstone Exhibition** – Despite the challenges that faced the newly opened schools in the first semester, Capstone exhibitions completed successfully. STEM Unit led Capstones exhibitions for existing and new schools, showing progressive transfer of the work to local capacity. The Capstone exhibitions for Grades 2 and 3 at Ma’adi and 6 October were successfully run by school leaders and the STEM Unit. Local STEM Committee members were able to observe at Ma’adi and 6 October. Grade 1 Capstone exhibitions were postponed till after the mid-year break to give new schools the opportunity to prepare for their first exhibitions.



During the mid-year break, leaders in new schools received training and were led through the final preparation processes. The Grade 1 Capstones then were successfully run by the STEM Unit. In the next quarter, the project team will work with the STEM Unit to complete the transfer of evaluator recruitment and data management.

ECASE provided support with new documents and checklists (for new schools), revised training and associated materials, and made modifications to the Capstones to address plans of the new schools.

- **Preparatory English Extra Curriculum Activity** - During this quarter ECASE developed the English for STEM Preparatory Extra Curricular Online Learning Activity Program (e-STEM Preparatory). The program targets all Preparatory students in governmental schools. It provides opportunities for prep students to learn and practice reading, listening, speaking, writing, and grammar independently with the support of English teachers. Additionally, the program orients the students to the STEM high schools learning and teaching culture and increases their interest in science and mathematics.

ECASE trained Trainers, Supervisors, and Teachers from 25 governorates on implementing e-STEM online program. A pilot phase has been set to run in April 2016 in the 25 Governorates in Egypt, 2 schools in each Governorate; 1 rural and another urban school. The Pilot specifically targeted girls, and underprivileged areas. Data from the piloting will be

collected and analyzed in the next quarter.

- **Professional Development** - During this quarter ECASE delivered a professional development institute (PDI) for 129 teachers (98 male and 31 female). The training was targeting three categories; teachers hired after the beginning of the school year, teachers hired last summer, experienced STEM teachers from Maadi and October schools, and school leadership. In addition to training on pedagogy, capstone, and assessment, the mid-year PDI focused on the use of technology platform by students including the curriculum application and the PARLO tracker which was delivered to all STEM staff including teachers, principals, and deputies. It was also characterized by practical lab work for STEM teachers and the piloting of the Teaching English Language Learners in Content Classes (TELIC) for all STEM teachers from Maadi and October schools. The leadership training focused on exchanging experience and problem solving. The principals and deputies were involved in hands on applications to solve real-time challenges they are facing at school. The PDI also included content specific training for local STEM supervisor.



The Mid-year PDI this year was characterized by an increased role for local trainers. The training on pedagogy, assessment, curriculum, and capstone, for the new teachers was delivered by local trainers with no or minimal support. The training on the new interface of PARLO tracker was delivered by local trainers in collaboration with ECASE consultant. The pilot TELIC training was delivered in collaboration between local and ECASE consultant. The content training for the local supervisors was delivered by local trainers with observation from ECASE consultants. PDI Schedule (*Annex I*)

- **STEM Extra Curricular Activities for Middle Schools** – During this quarter, ECASE worked with a team of MoE trainers, a representative from the counselor of Mathematics, and a local consultant and reviewed ESP Scientific Club assessment report, the summer camp manuals, the admission criteria for secondary STEM- schools and prepared a draft framework for a STEM activity for the preparatory stage including, the objectives, the methodology, session outline, and sample. The activity was shared with STEM Unit members in three different meetings during which they discussed how it can be implemented within the Egyptian school system, and gave their feedback on the framework and sample sessions. The STEM Unit member suggested adding this activity to the list of optional activity for basic education students under the ministerial decree 313 and its modifications. Currently there are 14 draft sessions ready to be shared with the STEM unit for feedback in addition to the general framework of the activity.

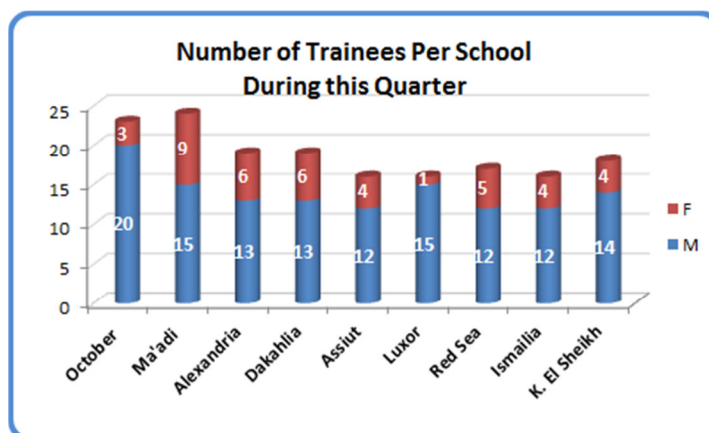
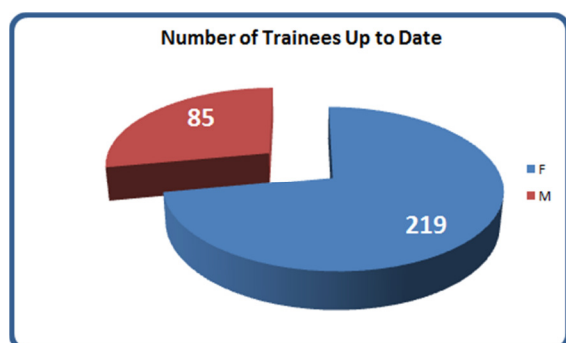


- ***University Readiness Test (URT)*** – URT pilot tests were conducted in two STEM schools Maadi and October on March 16-17. The purposes for the pilot test administration are to evaluate psychometric quality of the items, and to receive feedback from students on the pilot administration. A standardized test administration manual was developed for test administrators. That manual explains instructions for each step including: delivery of boxes to the school containing secured test materials, distribution of the materials among test administrators (for different classes), reorganization of student seating arrangements, distribution of test instruments and answer sheets (through spiraling), collection of test instruments and answer sheets, securing them in the return boxes, and sending the boxes back to the MOE. The pilot test data was analyzed for examining psychometric properties of the items. A classical test theory-based statistics was calculated. About 50% of items in the pilot tests were psychometrically acceptable. The remaining 50% of items were rejected because of wrong answer keys or out-of-range difficulty and discrimination values. The analysis report was shared through Skype call with MOE's Subject Counselors and subject experts on March 23 to take them through the item analysis reports.
- ***Fab Labs*** - Fab Labs were delivered to the 3 New STEM schools (Alexandria, Daqahlia and Assuit) in addition to the 2 original schools (October and Maadi) on the project. Fab Lab managers for Maadi and October installed the Fab Labs in the three new schools so during this quarter ECASE consultant inspected Fab Lab installations, calibrated and tuned up all Fab Labs at five Egypt STEM. Moreover operation and maintenance training was provided. MOE assigned 5 new Fab Lab managers for newly opened schools. The first phase of training (TIER1) was provided to all new Fab Lab Specialist. Training was conducted by combination of the Fab specialists of Maadi and October.
- ***PARLO Tracker*** - ECASE Tracker Experts worked with the MOE officials in Cairo during the early part of this quarter to perform the installations and training for TDC staff and schools IT. Access to the Tracker System outside of the TDC was delayed twice. Once was due to technical configuration issues with the Microsoft Firewall and the other was the need for customized code created by an ECASE Tracker Expert to reloading in Learning Outcomes for courses that had been modified since the beginning of February. Teachers and School Leadership teams were sent their credentials to log in to Tracker the beginning of March (mid-way through the semester).
- ***Supporting start up of new STEM Schools through BOTS*** - This quarter witnessed relative stability in the new schools. The first term exam was successfully held, the first capstone exhibition was also successfully managed by all schools. All schools nominated and appointed the external BoT members and all schools now have a team for asset mapping their governorates. The project supported the planning and implementation of the capstone in the new schools. This included the provision of material for all schools, the organization of the exhibition, the printing of posters and the organization of the evaluators in collaboration with the central STEM units. Local STEM committee members participated in capstone evaluation as a hands on capacity building by teaming with an experienced evaluator.

List of BoT contributions to the schools

| School | Items | Notes |
|----------------|-----------------------------------|--|
| Red Sea | Sports equipment | Football, volley ball, tennis table |
| Red Sea | Stationary | Photocopying papers |
| Red Sea | Equipment | Printer, Mic, Speakers, Mosquitoes Zipper |
| Luxor | Equipment | Water cooler |
| Assiut | Protocol with Assiut university | To allow students access to use the labs and benefit from contact with professors. |
| Red Sea | Financial contribution | 4450 LE last quarter |
| Luxor | Financial contribution | 2090 LE last quarter |
| Alexandria | Student Transportation | Provided by the city council with an estimated 35,000 LE |
| Alexandria | Student medical insurance cards | Provided by the city council |
| Alexandria | Rent for study halls for students | Provided by the city council with an estimated 9,000 LE |
| Kafr El Sheikh | Equipment | Printer |

- Training** - During this quarter ECASE implemented several training sessions and STEM Unit meetings. The total number of trainees during this quarter was 277 (200 males and 77 females). Total number of trainees (teachers, fab lab specialist and social workers) in all schools is 168 (126 males and 42 females), however the total number of trainees in all MOE departments is 109 (74 males and 35 females). During this FY, the total number trainees to date are 304 (219 males and 85 females). All training events during this FY are attached. (**Annex II**).



2. Activities leading towards accomplishment of Program objectives

2.1 Project Management

During this quarter ECASE submitted a cost and time extension on January 29th, received extensive comments from USAID on the Technical Proposal and the Budget Notes on March 3rd, and resubmitted its proposal with answers to the comments on March 12th. Additional comments from USAID were received on March 30th, and another submittal was made by ECASE on April 7th. Because the extension approval took more time than expected, ECASE was providing support to the four additional schools in Kafr El sheikh, Ismaleya, Luxor and the Red Sea based on a pre-modification letter issued by USAID on October 8th allowing World Learning to work with these schools to provide specific services within a funding ceiling until January 7th. On January 14th, ECASE communicated to USAID that the duration has expired without an extension approval and that World Learning needs to increase the funding ceiling and the duration in order for it to continue providing its services to these additional schools as part of its CA. ECASE received on January 24th another letter from USAID allowing it to proceed with its service provision until April 23rd with a higher funding ceiling. ECASE is operating under the authorization of this latest letter, but may have to further extend it if an extension approval is not received by that date.

2.2 Project Activities

This section summarizes key accomplishments against the AIP for each objective area. All project activities are part of a larger iterative process and many aspects of individual activities overlap with other activities. The summary, below, is presented according to the last discussed version of AIP.

Objective 1: Increase student interest, participation, and achievement in science and mathematics with special effort to underrepresented groups such as girls and economically marginalized students.

To support the Board of Trustees to *Promote parent involvement through a school-level STEM Board of Trustees (Activity 1.2a)*, BoTs continued to meet regularly on a monthly basis. During their meetings they focused on solving problems and creating opportunities for students. They discussed providing financial support to schools and establishing links with research centers, universities, and businesses. Examples of BoT support included providing sports tools, stationary, and equipment. BoTs also paid attention to student's welfare; in Luxor they are working hard to find an accommodation for students that is closer to the school to reduce the commute time. BoT meetings usually include members of student union for boys and girls, teachers, and the head of local STEM Committee. BoTs also used their meeting to enhance relation between teachers and students. Project regional staff also coordinated with the local

STEM committee and the undersecretary to provide an engineer to manage the fab lab in Assiut and the Red Sea. They also coordinated with the Undersecretary in the Red Sea to provide transportation for the students in all field trips.

ECASE team updated training materials for newly formed BOTs at all schools. Materials included (1) an overview of the Egypt STEM schools, (2) an overview of their role as a BOT, (3) introduction to school specialization and public-private partnerships, and (4) an asset mapping exercise to begin the process. The training was designed for the Ministry Social Worker and ex-officio, non-voting member of the BOT so that they could take responsibility for their training their own BOT with these materials. The training of these representatives was conducted in Cairo successfully. In the next quarter, the ECASE team will follow up with the BOTs to ensure the training has occurred and the asset mapping exercise is yielding connections and new opportunities for the schools.

Local STEM committee provided material for science and art teachers. They also coordinated with the Mudderia library department to provide 1000 LE for books to the school library. Local STEM committee supervisors visited the school regularly and conducted classroom observations; at least once a month.

To promote the STEM school within the surrounding community through Fab Labs (Activity 1.2b), The five project schools are all now equipped with Fab Labs. The installations have been checked by ECASE consultant and also supplied training to new TDC members so that they can take over Fab Lab management at the new schools. Specifically, the managers were trained on safe use and maintenance of the equipment and the first phase of Fab Lab training (Tier 1) elective course being piloted in Ma'adi and 6th of October.

Ma'adi and 6th of October Fab specialist participated in Cairo's Maker Faire in March that saw attendance in excess of 10,000 attendees, many more than last year. Next year the Maker Faire will be an opportunity for the Egyptian STEM Schools to spotlight their integration of Fab Labs into STEM education.

In the next quarter, the ECASE team will form a community of practice (CoP) led by the Fab Specialists at Ma'adi and 6th of October and including all of the TDC staff leading the Fab Labs in the network. This CoP will meet virtually weekly or bi-weekly as needed to support each other in our goals and troubleshoot issues.

In order to ***prepare students for the rigors of English Language based STEM education (Activity 1.3)***, during last quarter, training has been conducted to English teachers in all STEM schools. By the time the school year has started, the English teachers have oriented G. 10 & 11 Students with the program and work strategy. By Oct. and Nov. 2015 the STEM students have registered in the program and started to work independently following the shared suggested outline, matching with the STEM Content Subjects outlines. Grade 10 and 11 English teachers

have received e. STEM Integrated activities and were requested to run the integrated activities in classes, weekly.

To Support *Outreach to Egyptian Preparatory Schools (Activity 1.4)*, during this quarter, ECASE held three workshops with a team of MoE trainers, a representative from the Mathematics Counselor's office, and a local consultant. The workshops included presentations of the STEM school model, the academic and social challenges faced by students during the first three months of school. The team also reviewed ESP scientific club assessment study and the STEM summer camp activities. The team drafted a list of objective for a STEM activity for preparatory stage based on two sources: the list of challenges faced by students when they start school and the list of admission criteria for STEM secondary school previously developed by ECASE.

The team used the list of objective to draft an outline for the complete set of sessions to be included in the STEM for preparatory stage activity. They also drafted an outline for the session structure and developed one session as a model. The activity framework, the list of objectives, and the model session were shared with STEM unit in three consecutive meetings and for feedback. All feedback from STEM unit is currently being incorporated as needed into the general activity framework and model session.

Discussions with the STEM unit focused on how the activity can be implemented as part of the school day in a manner that does not conflict with the regulations or the day to day operation of the schools or add to the teachers' workload. The STEM unit members suggested that the STEM for preparatory activity be added to the list of optional activities a preparatory student can select under the 313 ministerial decree for cumulative assessment in basic education. After reviewing the decree, the team found that there is a scientific activity in the list of optional activities that students can select. The next step is to work with the counselors of Science and Mathematics to use the activities developed by ECASE as the content for this activity and that it can be implemented by the Science or Mathematics teachers.

Objective 2: Strengthen the STEM School local initiative through developing an effective model of specialized high schools focusing on science, technology, and mathematics for gifted students.

To *Tailor the STEM School to the surrounding community through school specialization (Activity 2.1)*, during this quarter ECASE held a two-day workshop for Social workers and Social worker trainers on the roles and responsibilities of BoTs and asset mapping for school specialization. These asset maps can be used by the principals with support of the Ministry to add local touches to the schools, including extra-curricular activities, field trips, career mentoring, internships and connections to external experts for Capstones. The workshop included a discussion around the unique roles and responsibilities of BoTs in STEM schools and how conducting an asset mapping of the community around the school can help school specialization.

The Social workers drafted an action plan for conducting asset mapping in their governorates and upon their return they worked with the principals and formed a team to start the asset mapping process. The teams included BoT members, Teachers, and students. The participants conducted a quick asset mapping as practice based on their knowledge of the school community. The asset mapping in the schools will focus on:

- Linking extracurricular activities and student capstone projects to opportunities in the relevant institution.
- Orienting the community to the nature and value of STEM schools and mobilizing their support.
- Building partnerships between the school and the spectrum of relevant community institutions.

The discussion around the unique aspects of BoTs in STEM schools resulted in the following recommendations:

- The membership and geographical representation should reflect the distribution of the parents
- Allowing the STEM schools and BoTs to have a separate bank account.

ECASE will follow up with the BOTs and principals in the next quarter to make sure plans are beginning for the fall semester. The project team will also ensure the central STEM Unit is engaged to assume responsibility for this process in cooperation with the local STEM Committees.

In the current quarter, the ECASE project ***provided essential educational infrastructure to support experiential classroom activities (Activity 2.2,*** ECASE continue to deliver the essential educational infrastructure to STEM schools including Math Connections (3,122 textbooks) which were distributed for G10 in 9 schools. Additionally, 1250 Science textbooks, Biology, Chemistry, Physics and Earth Comm. were equally distributed to complete previous distributed books. Moreover, 360 Graphic calculators, 3 firewall and 75 e-beams were delivered and installed in Alexandria, Daqahlia and Assuit. Fab Lab furniture (cabinets and tables) and chairs for all labs are also installed in Alexandria, Daqahlia and Assuit. Finally some electronic equipment (hardware and software) was also delivered as following;

| | |
|--|----|
| Generic graphical simulation software NI, Academic Site License Lab-VIEW Teaching, Only (Small) ASL 1 Seat(s) NOT CONCURRENT Academic Site License Teaching Standard Service Program | 3 |
| Electronics and electric circuit software NI Academic Site License Multisim Lab-VIEW Teaching Only (Small) ASL1 Seat(s) NOT ONCURREN Academic Site License Teaching Standard Service Program | 3 |
| Integrated data acquisition device: NI ELVIS II+ Hardware [For academic use only] | 9 |
| Standalone and portable data acquisition device NI my DAQ Student Kit Hardware Only | 60 |
| Standalone FPGA Units NI Digital Electronics FPGA Board | 9 |

During next quarter Fab Lab machines for the 4 STEM schools (Luxor, Kafr Elsheikh, Rea See and Ismailia) will arrive to the customs by the end of April 2016. Grade 11 and 12 Math connections textbooks (5460) and 2700 Science textbooks (Biology, Chemistry, Physics and Earth Comm) for three STEM schools are under process and purchase order will be issued early next quarter.

The STEM Unit now takes the lead to *create sustainable and mutually beneficial PPPs (Activity 2.3)*, two protocols were developed and now under the process of taking decision from Executive Committee, the first one is between Central STEM Unit and Ministry of Industry, while the second one is with GIZA Foundation.

To *organize extracurricular Activities feeding STEM program implementation (Activity 2.4)*, All STEM Schools implemented numerous educational activities visits to some scientific institutions, including: -

- Alexandria STEM School conducted visits to the University of Japan, Faculty of Science, Alexandria.
- Kafr el-Sheikh STEM School, has been organizing a good range of visits to many educational institutions to compensate the weakness of equipment for laboratories including Faculty of Science kafr ElSheikh University, Zwiell City, October STEM School, Alexandria Company for Oil in Kafr Elsheikh, Nasr Company for Spinning and Weaving in Kafr El Sheikh, Suez Gas Company in Kafr El Sheikh, and finally Faculty of Engineering Kafr El-Sheikh University.
- Two students from Red Sea STEM School visited AUC and the interview with the president of the university and Dean of electronics department to get some information to help them in their research. Another visit was to The Institute of Marine Science, German University Hurgada (El Gouna) and finally a visit to El-Sokarry gold astrolo ger.
- Assiut STEM school visited Assiut University and used the new power Labs in the Mechanical Engineering department. They also visit Zewail University and attend a lecture on the Smart material and visited university laboratories, including the Nano



Technology. Finally invite Sun Company to the School to explain the solar energy produced and used as it is related to their Capstone project.

Objective 3: Build the capacity of highly qualified cadre of STEM professionals and provide opportunities for training and sustained, intellectually rigorous professional learning.

To *adapt teacher and administrator performance standards for a STEM school context (Activity 3.1)*, teacher competencies have been drafted previously. The job descriptions approved by the Executive Committee for Principals and Deputy Principals will be the basis for competencies documents that will be completed in the next quarter, aligning with evaluation protocols and processes.

To *build teacher capacity to effectively implement STEM curriculum in the classroom through Best Practices in STEM (Activity 3.2a)*, During this quarter ECASE delivered a professional development institute (PDI) for teachers hired after the beginning of the school year, teachers hired last summer, and experienced STEM teachers from Maadi and October school. In addition to training on pedagogy, capstone, and assessment, the mid-year PDI focused on the use of technology platform by students including the curriculum application. Now that connectivity is active in all schools, yearlong plans of professional development for teachers and school leaders via virtual coaching sessions is being scheduled and confirmed.

To *Build teacher capacity to effectively implement STEM curriculum in the classroom through creating formative classroom assessments (Activity 3.2b)*, In the January 2016 PDI, assessment team completed a Formative Assessment training for beginning teachers with the support of one of STEM Unit members using STEM Professional Development Trainer manuals. Presentation materials have been updated as a result.

In January 2016, it was decided to hold a weekly conference call between the assessment team and Khaled Alsied, the MOE representative for assessment in Egypt. Khaled has been coordinating much of the assessment initiatives on the ground for the Egyptian STEM and also serves as the liaison to the assessment team. The instituting of this conference call enables the project's assessment team and Khaled to communicate on vital assessment issues. Since initiating this process, there has been a call each Monday to focus on assessment and to discuss such issues as the summative exams, formative assessment issues and the Test of Concepts. One of the outcomes of these virtual meetings was a review by the assessment team of the Student Guide for First Term Exam Manuals for Grades 1 and 2 that had been developed by one of the STEM Unit Members. Team members John Baker, Bates Mandel, Vivian Loewenstern, and John Weathers are in the process of providing feedback on these manuals.

To support *STEM Curriculum Training and Coaching (Activity 3.2c)*, ECASE Provided curriculum specific training for both beginning and new teachers during the PDI and spending time with experienced teachers on lab activities and usage. ECASE expert conducted one school visit with STEM Unit member and local supervisor to be able to coach and model work with

STEM Unit members on their school site reports and visits. (Deborah Please elaborate about the one/two field visits)

To ***build teacher capacity to effectively implement STEM curriculum in the classroom through skills refresher in English language and TELIC (Activity 3.2d)***, the STEM-TELIC Training aims at strengthening teachers' capacity to teach STEM content successfully in English –medium classroom by developing teachers' skills and knowledge of:

- Evaluating language challenges for learners of STEM content
- Implementing collaborative, interactive learning approaches in the stem classroom which foster interaction in English
- Planning STEM lessons which enable students to successfully encounter, practice and internalize STEM-content relevant English language
- Supporting students' reading of stem materials and acquisition of STEM –related vocabulary in English
- Using good classroom practices which improve learning of both content and language

The anticipated Student learning related Goal:

- Improving student learning of both STEM content and English language through improving teachers' skills in dynamic, collaborative, interactive classroom practices.
- Enhance students' language learning by developing teachers' awareness of language learners' challenges and how to overcome them.

The STEM course comprises two integrated components:

- A seminar phase involving thirty hours of workshops in a modular format offered through face-to-face training (Sunday, 31 January – Thursday, 4 February)
- An implementation (follow-up) phase of approximately three months during which participants will apply what they are learning directly in their classrooms, supported by classroom-based, application tasks, classroom observations and feedback, and on-line conferencing and coaching (February to May 2016).

In order to ***assess progress through classroom observations (Activity 3.3)***, during this quarter ECASE selected MoE supervisors who previously participated in data collection on teacher performance. Eleven supervisors were selected based on criteria including actual participation in similar tasks, both STEM and humanities representation, work in the secondary stage, and not currently linked to any of the STEM schools. The data collectors were trained for using modified COS tool. Training included an explanation of the tool domains and competencies, a practicum observation using videos, and planning for data collection. The data collectors also attended a one-day preparation meeting, in which they received their final schedule and finalized the data collection process.

A fifty percent sample of the teachers was selected using the following criteria: the number

of training hours, specialization in Mathematics, Science, English, Arabic, and Social Studies. 65 Teachers were selected for the sample including 37 STEM teachers and 28 humanities teachers. Data collection was completed for 33 STEM teachers, and 25 humanities teachers. 11 teachers were observed by two data collectors to assess inter-rater reliability.

The tool used for data collection was a modification of the COS into a tool that can produce a numeric value and used to assess performance of teachers in relation to training. The tool was piloted in Maadi and October schools and was modified based on feedback discussion with the data collectors. The data analysis and reports will be completed in the following quarter.

To ***build school principals' ability to develop and implement strategic STEM action planning frameworks (Activity 3.4)***, during PDI, The leadership training focused on exchanging experience and problem solving. The principals and deputies were involved in hands on applications to solve real-time challenges they are facing at school. As well as follow-up email and virtual meetings, continued a focus on building school culture, effective scheduling for STEM schools and supporting and evaluating STEM teachers.

In order to ***identify and build the Capacity of Master Trainer (Activity 3.5)***, During the PDI, candidates were involved in planning, facilitating and co-facilitating all aspects of training. Vital to their development and also to their future certification, candidates were involved in the planning, implementing and debriefing of activities. In the upcoming Quarter, a priority will be placed on identifying the strengths of all current ToT Candidates, identifying training areas that lack candidates, and preparing all Candidates for both certification and upcoming summer training.

STEM Unit members and local supervisors were engaged in professional development activities both as trainers and as participants. Additional responsibilities in the area of planning were released to STEM Unit members so that they demonstrate and understand ownership of the professional development process.

To ***create a virtual STEM Professional Development Learning Platform (Activity 3.6)***, ECASE has continued to iterate on our existing online tool set for managing school processes, and as part of that process has been building a library of video tutorials and user manuals to accompany these tools. Additionally, virtual meetings have been recorded on video where appropriate and stored online for future review.

Specific updates to the web apps developed in the past quarter include:

- The existing capstone journal web app has been modified to include requested additions from the STEM unit, and has been setup for new schools by the TDC team within Egypt. Adoption has been swift and highly successful: most new schools have completed their assessment of the first capstone journal before the second is administered (as compared to the first semester where this process took months instead of weeks) and students will receive formative assessment feedback as planned.

- The curriculum web app continues to be well used by teachers, with over 1,100 lesson plans created from planned learning outcomes this year. It's important to note that not all of these are actively edited (i.e. in some cases teachers may have started and abandoned lesson plans), but in well over half of these documents teachers are documenting classroom activities and discussing their work with their colleagues.

Objective 4: Strengthen MOE capacity at the systems and policy level to sustain and replicate these model schools.

To develop comprehensive national assessment instruments aligned to STEM Curriculum (Activity 4.2), it was decided on December 10 that there will be four URTs (English, Mathematics, Science 1 containing Physics and Chemistry, and Science 2 containing Biology and Earth Science), the subject experts were requested to create more items (aligned with Year 3 LOs) necessary for the pilot and operational tests. After the items were developed, they were reviewed for alignment and content adequacy, and were then entered into the banks. The revised item banks contain: 325 items in English, 230 Mathematics items, 84 Physics items, 77 Chemistry items, 95 Biology items, and 108 Earth Science items.

To assemble pilot test instruments (i.e., two forms in each subject) using the FastTest software, a pilot instrument development workshop delivered on January 10-14. Since the item banks were not completed prior to this workshop, the subject experts (except English and mathematics) were asked to complete the item banks on the first three days (January 10-12). In contrast, the English and mathematic subject experts were trained individually on the first day, and later started putting together the pilot instruments in FastTest. By the end of the workshop, participants were able to develop draft pilot test instruments for English, mathematics, chemistry, and earth science. The biology and physics pilot instruments had yet to be completed. The draft instruments were later given to the subject experts for a thorough review of content and correct keys.

To take the Ministry of Education's Subject Counselors through the URT design and implementation status. It was initially planned (based on best assessment practices around the world) that items with strong psychometric properties (from pilot testing) should be considered for operational tests, so that the quality of the operational tests could be guaranteed.

A presentation to the head of General Education sector and Subject Counselors on January 13, in the presence of USAID AOR to brief them on the URT status. A separate meeting was conducted with MOE's Subject Counselors on January 14 to discuss the designs for pilot and operational tests. In order to address MOE's concerns properly, it was agreed to use two (instead of three) instruments in the pilot tests so that more items can be secured in the banks for the operational tests. Also to identify items with strong psychometric properties, examine their content profiles (qualitative characteristics – language, expression), and then modify those items or develop new items matching those profiles for the operational tests.

To analyze pilot test data for examining psychometric properties of the items, The classical test theory-based statistics was developed to find out: how difficult were the items, how well did the items discriminate between higher achieving students and lower achieving students, which incorrect options did the students find plausible, how differently were male and female students performing on the items, etc. Items with a difficulty level of 0.20-0.90 and a discrimination value of 0.20+ were considered to be acceptable (APA/NCME/AERA, 1997). About 50% of items in the pilot tests were psychometrically acceptable. The remaining 50% of items were rejected because of wrong answer keys or out-of-range difficulty and discrimination values. Pilot test data were analyzed separately for each subject and form on March 16-18. Therefore, item analyses were carried out 12 times (6 subjects x 2 forms in each subject) and 12 separate item analysis reports were generated. The reports were shared with MOE's Subject Counselors and subject experts on March 18 for their review.

A Skype call was held with MOE's Subject Counselors and subject experts on March 23 to take them through the item analysis reports. During the call, it was explained the interpretations of various item statistics, and how to improve the quality of the items based on feedback. Although these subject experts have been developing tests and examinations for decades, they have never received any feedback of this nature in the past, and as a result, this was an eye-opening experience for them. The NCEEE does analyze the *Thanaweya Amma* data; however, no feedback is provided to the Subject Counselors' office regarding performance of the items on the tests.

A series of assessment trainings have been scheduled for the month of April 2016 for governorate supervisors and new test developers appointed by the science and math Consultants that includes SEC trainings, item analysis trainings and TOC trainings. Assessment Team staff have contributed to the development of training materials for these spring assessment trainings. Included in these training materials will be an assessment archive of all previous training documents used during the Egyptian STEM Project.

Objective 5: Support the MOE in upgrading science and mathematics curriculum standards, students' assessment, and teacher preparation for the mainstream.

To support *Upgrading STEM National Curriculum Standards (Activity 5.1)*, Building on work started both independently and in concert with CCIMD and MOE team during the Jan-Feb (**Deborah Please elaborate**), a draft of the Egypt STEM School Curriculum Framework has been drafted and is currently in revision.

To *Capture Best Practices in STM Education (Activity 5.2a)*, ECASE project have continued to work with members of the MOE STEM Unit on a weekly basis throughout the quarter to enable collaboration and transfer of knowledge to enable the MOE to sustain the work. Many of the STEM Unit members attended the professional development activities and, in fact, either planned and/or facilitated these sessions. Regular emails and teleconferences with members of the STEM Unit have maintained the lines of communication and provided support to STEM Unit members who had access to the schools.

Moreover, ECASE project will focus on the development of Capstone and Fab Lab communities of practice (CoP). CoPs will begin in the next quarter since internet connections have been established and schedules are being organized for the entire curriculum CoPs. For Capstone and Fab Lab, these virtual meetings will be led by local leadership and the project team

Evaluation Assignments and Monitoring

1. Choose a Journal

Capstone Journal 1 Grade 1 (STEM Maadi)

The following teachers have been assigned for this journal. To make changes [click here](#).

- ✓ principal@stemmaadi.edu.eg
- ✓ manar.hadaya@stemmaadi.edu.eg
- ✓ eman.zian@stemmaadi.edu.eg
- ✓ ahmed.raafat@stemmaadi.edu.eg
- ✓ manal.elkhadrawy@stemmaadi.edu.eg
- ✓ mohamed.abdelaziz@stemmaadi.edu.eg
- ✓ sally.husien@stemmaadi.edu.eg
- ✓ ahmed.zakarya@stemmaadi.edu.eg
- ✓ alaa.moatamed@stemmaadi.edu.eg

Capstone Journal 1 Grade 1 (STEM Maadi)

| Teacher | Assignment | Completed | BLUE | GREEN | YELLOW |
|------------------------------------|------------|-----------|------|-------|--------|
| principal@stemmaadi.edu.eg | 1 - 39 | 100% | 47% | 44% | 8% |
| manar.hadaya@stemmaadi.edu.eg | 40 - 77 | 100% | 54% | 31% | 12% |
| eman.zian@stemmaadi.edu.eg | 78 - 115 | 100% | 81% | 19% | 0% |
| ahmed.raafat@stemmaadi.edu.eg | 116 - 154 | 133% | 33% | 100% | 0% |
| manal.elkhadrawy@stemmaadi.edu.eg | 155 - 192 | 100% | 79% | 18% | 2% |
| mohamed.abdelaziz@stemmaadi.edu.eg | 193 - 230 | 100% | 74% | 25% | 2% |
| sally.husien@stemmaadi.edu.eg | 231 - 269 | 100% | 80% | 15% | 4% |
| ahmed.zakarya@stemmaadi.edu.eg | 270 - 307 | 100% | 53% | 46% | 1% |
| alaa.moatamed@stemmaadi.edu.eg | 308 - 345 | 100% | 61% | 32% | 6% |

will be present for support. ECASE will continue to meet separately with those leading these CoPs to help them learn how to make these meetings most effective.

To *continue Capstone Curriculum Implementation and Training for all Grades (Activity 5.3)*, ECASE project updated Capstones documents for semester 2 and mid-year PDI. All mid-year PDI materials were updated to include changes made over first semester. Beginning and experienced teacher training materials were updated with the most current changes and logos.

Capstone Challenges for Grades 1 and 2 were finalized by the central STEM Unit with support from the team and uploaded to the curriculum web app for all teachers to access. ECASE updated the semester 2 Capstone Teacher Workbooks for Grades 1 and 2 (there is no semester 2 Capstone for Grade 3). A draft Capstone Startup Manual was completed for the STEM Unit to complement the volume created for school leaders. An Academic Deputy Capstone “Checklist” and Capstone Leader “Checklist” for Capstone Responsibilities was developed at the request of the central STEM Unit.

The central STEM Unit led Capstone training for the local STEM Committees and



the ECASE developed the materials for this training. Training was provided for building leaders for Capstone exhibition design and implementation using materials previously prepared by the ECASE team and a new Capstone To-Do list in Excel form to guide new schools preparing to host their own exhibitions.

Google forms were prepared by ECASE to allow the STEM Unit to monitor all schools as they prepared for exhibitions.

The project team developed a Journal Assessment quality assurance process. The Google drive support to allow academic deputies and the STEM Unit to monitor the performance of the teachers grading Journals. A training video for using the Capstone Web App is available at <https://goo.gl/2QwfRx>. The simple dashboard reports on percent complete and the distribution of grades by each teacher. This simple change has already proven very useful for improving the rigor applied by teachers to this grading process and should be considered an important lesson learned for other areas where simple oversight might improve performance.

ECASE also performed and documented a Capstone grade quality assurance process to mitigate the risk of human error in data entry that can occur either by the evaluators themselves or the support staff entering data. In addition, the process reviews the grading behavior of the evaluators looking for outliers compared to their colleagues. This process has been documented and will be transferred to the central STEM Unit during the next quarter.

The central STEM Unit directed a cohort of Capstone ToTs to provide training for the new schools. The ECASE team ensured they had the necessary resources and conducted a debrief and review of this training with the trainers to inform the mid-year PDI also led by the STEM Unit and these ToTs.

The central STEM Unit and the Capstone ToT team led mid-year PDI successfully and the ECASE team provided access to requested exemplars in preparation for the training that used the existing training materials. The ECASE team then conducted a debrief with the training team after the mid-year PDI to inform future training. ECASE team updated the project calendar with Capstone journal assessments and exhibitions in cooperation with the Central STEM Unit.

Finally, while internet access issues prevented the startup of a community of practice (CoP) among the Capstone leaders and academic deputies, the project team supported the central STEM Unit and academic deputies of Ma'adi and 6 October with weekly virtual meetings (and more as needed). In the upcoming quarter, internet access permitting, we expect to start the Capstone CoP led by Dr. Amany of the STEM Unit and supported by the project.

3. Challenges and Resolutions

The security situation in general and staff safety in particular have risen during this quarter due to notifications and meetings with USAID on both subjects. This was triggered when USAID approved the Danger Pay for its contractors and was reiterated with the call for the use of business visas and the later account for staff safety at all times. Such concerns emerge from a heightened alert and cause for more stringent security measures. The project has taken similar measures by relaying this message to its staff and partners in the US to take extra care while in Cairo. World Learning had updated its Security Plan early this year and submitted a copy of its latest issue to USAID, as requested, in late March.

ECASE has been procuring books as a main resource to its curriculum since the start of the project. Recently in March a batch of 350 Biology books were imported from the US and customs stopped the shipment to review few pages in the book that included maps that do not conform to Egypt's approved borders. The project was asked to either export the books, tear the pages from the books or destroy the books. ECASE communicated with the Ministry and negotiations are taking place to help release the books. Similarly and since November 2015, the three 3D printers that arrived with the three Fab Labs for Alexandria, Assiut and Daqahleya schools were retained at customs and were not permitted to clear. Talks between the Ministry of Education and the Customs Authority allowed ECASE to clear the three 3D printers recently. Similar talks are expected to clear the curriculum books soon.

After the Public Private Partnership employee left the project in late December the project has faced serious problems in recruiting a new candidate. Adverts were placed in INGOs HR groups, at the AUC Career Center, at DevEx website and no serious candidates were found. ECASE solicited the services of one recruitment agency and after one month declined the commission because the right candidate was not found. ECASE commissioned the service of another recruitment agency to find a suitable candidate and for the past two weeks no candidates were produced for even an interview. One of the challenges faced is the time left on the project, even after an extension is awarded. Finding the right candidate for this position is not easy and have faced serious setbacks. The project is, however, determined to find the candidate who will help it realize its cost share goals and create the partnerships necessary to make this happen. The effort has not been dropped after the departure of the PPP employee. Other within the project are taking this responsibility and various meetings and efforts have still been exerted this quarter to explore new opportunities and follow up on existing ones.

The implementation of TELIC was finally launched this quarter along with the preparation for the Scientific Clubs outreach and the e STEM Online pilot for preparatory schools. These three activities have taken the project a long time to prepare and implement because it was busy with other more important and substantial components that delayed the roll out of these activities. Their start as in the case of the Scientific Clubs and in some cases their

actual implementation start as in the TELIC and e STEM Online were major achievements after a long delay.

The validity of Google Drive has been questioned by USAID several times and especially within the comments received on the extension proposal. This was primarily a target because its architect is operating from the US and not in country and that the technical assistance provided is ineffective when it is only done remotely. ECASE has presented a limited LOE for the expert working on Google Drive from the US with the hope to find a local alternative who can provide the needed capacity building with the TDC staff. ECASE is presently working on finding this person and is expecting to put somebody in place before the end of April to have enough overlap to transfer knowledge before the Google Drive expert leaves the project.

Annex I: PDI Schedule

Annex II: Training Events

Annex III: Meetings Minutes

Annex IV: Project Geographic Locations